

3.0 SAMPLING AND ANALYSIS PROCEDURES

This section describes the sampling and analysis procedures to be used for the MPF STDT to demonstrate the lead emissions are not a threat by comparison to the RCRA HHRA. Any deviations from the specified protocols will be documented in the final report. A detailed description of the procedures can be found in the QAPP located in Appendix A. Throughout the overall program, the sampling contractor will utilize EPA-approved sampling protocols. Any proposed modifications to approved methods or procedures will be presented to DSHW for approval prior to implementation and will be documented in the final report.

Operation of the MPF using spray tanks is regulated by the RCRA permit the Title V permit and as a result, certain monitoring information will be collected. The sampling and analysis objectives for the TOCDF MPF STDT are as follows:

- Demonstrate control of CO emissions by maintaining the CO concentration at < 100 ppm, corrected to 7% O₂, on a 60-minute rolling average, and <1.45 lb/hr dry volume basis.
- Demonstrate control of PM emissions by demonstrating the concentration is < 34 mg/dscm corrected to 7% O₂.
- Demonstrate that mercury emissions are < 130 µg/dscm corrected to 7% O₂.
- Demonstrate that the combined emissions of lead and cadmium are < 240 µg/dscm corrected to 7% O₂.
- Demonstrate that the combined emissions of arsenic, beryllium, and chromium are < 97 µg/dscm corrected to 7% O₂.

An outside sampling firm will conduct the MPF STDT sampling. The TOCDF Chemical Assessment Laboratory (CAL) will analyze the agent samples for organic compounds and metals. Brine samples will be analyzed for agent and will only be sent off-site for metals analysis if the agent concentration is below the Waste Control Limit.

3.1 SAMPLING LOCATIONS

Samples will be collected from the exhaust gas and the major process streams involved in the operation of the MPF and the MPF PAS. Samples of agent, Brine, process water, and NaOH makeup solution will be collected and analyzed separately.

3.1.1 Exhaust Gas Sampling Locations

The LIC1, LIC2, MPF, and DFS share a common stack. This arrangement makes it necessary to collect samples of the exhaust gas in the duct (MPF Duct) between the MPF ID fan and the collector duct for the common stack. Exhaust gas in the MPF Duct will be sampled using CEMS, agent monitoring equipment, and the EPA sampling trains. Figure 3-1 shows the MPF sampling ports used for the CEMS, Automatic Continuous Air Monitoring System (ACAMS), Depot Area Air Monitoring System (DAAMS), and the sample trains. The CEMS probes are located in the MPF Duct. These CEMS will monitor the exhaust gas continuously. Monitoring at these locations is discussed in Appendix A, Section 6.3.8. Agent monitoring will be limited to normal operating modes. Exhaust gas samples will be collected in the MPF Duct using EPA Method 29 (2) and Method 5 (2).

Agent monitoring takes place in the MPF Duct and in the common stack. The DAAMS in the MPF Duct (Station # PAS 703) will collect the normal monitoring data. Staggered agent VX ACAMS will be located in the MPF Duct and will collect data (i.e., two ACAMS on-line and another serving as a backup). The ACAMS and DAAMS for the common stack are used to monitor agent as a final check on the gas before it exits the system. The common stack and MPF Duct ACAMS are AWFCOs for agent.

The MPF Duct also has sample ports to conduct exhaust gas sampling with the EPA sampling trains. Two sets of isokinetic sampling ports are available for collecting exhaust gas samples. The sampling locations meet acceptable standards for distance from duct bends or disturbances per Method 1 requirements (2). Each set of two sampling ports are 90 degrees apart and intersect in the center of the test section. The sampling trains will switch to the 90-degree traverse midway through the sampling run. Tables 3-1 lists the sampling ports associated with each sampling train for the MPF STDT.

3.1.2 Process Sampling Locations

Samples of the process streams will be collected at various locations. The process water will be collected from a process water drop in the PAS. The NaOH makeup solution will be sampled from a valve on the discharge side of the pump moving the solution to the PAS. Samples of Brine will be collected from a valve on the discharge side of the Brine pump in operation. Agent samples will be collected from the ACS tanks or the Sampling Enclosure in Room 123 as described in Section 3.2.2.

FIGURE 3-1. MPF Exhaust Gas Sampling Port Locations

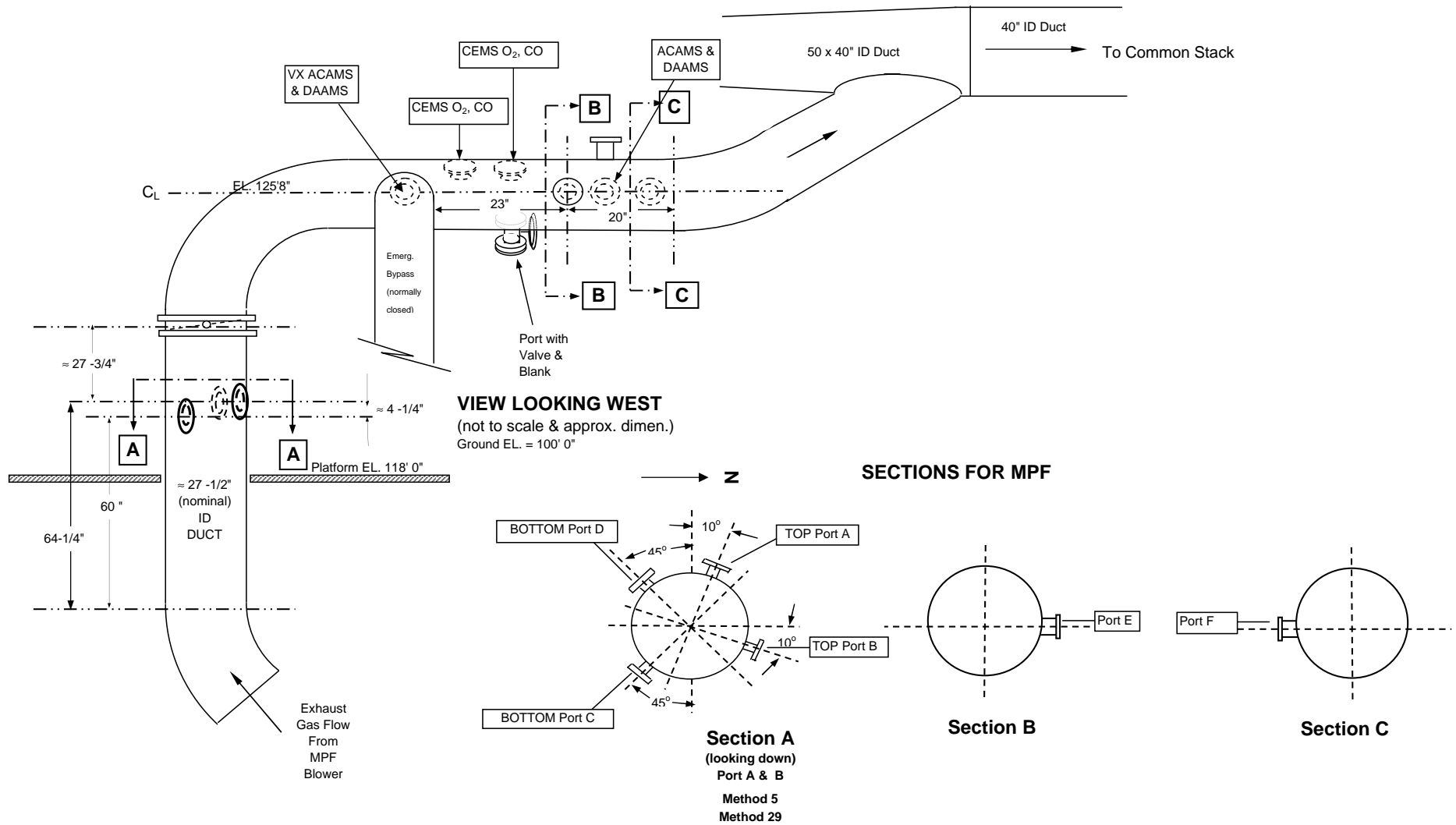


TABLE 3-1. MPF EXHAUST GAS SAMPLING SUMMARY

SAMPLING TRAIN	ANALYSES PERFORMED	LOCATION	PURPOSE
Method 1	Traverse Points	Each Port	Report Information
Each Isokinetic Train	Exhaust Gas Velocity	Isokinetic Trains	Report Information
Each Isokinetic Train	Exhaust Gas Moisture	Isokinetic Trains	Report Information
Method 3	O ₂ and CO ₂	2 bags with the Method 29 train	Report Information
Method 5	PM	Ports A and B	Report Information
Method 29	HHRA Metals and Total Phosphorus	Ports A and B	Report Information
ACAMS	Agent VX	Common Stack	AWFCO
DAAMS	Agent VX	Common Stack	Agent Confirmation
ACAMS	Agent VX	MPF Duct ACAMS Port	AWFCO
DAAMS	Agent VX	MPF Duct DAAMS Port	Report Information
CEMS	O ₂ and CO	MPF Duct CEMS Port	Report Information

3.2 SAMPLING METHODS

3.2.1 Process Stream Sampling Methods

Liquid process samples will be collected by Method S004 (5). The sample will be collected by attaching a sample line to the tap and flushing the sample line. The flush will be managed as hazardous waste, if appropriate. The sample line is inserted into the sample container. This method ensures the actual material collected is representative of the stream. Separate sub-sample bottles are used for each sample. The Brine sample will be collected during the final 60 minutes of the run. Other samples will be collected during the run.

The residues will be removed in the same process used for ton containers. The top of the spray tank will have a section removed to allow the operators access for cleaning inside the spray tank. Residue from the spray tanks used for the run will be accumulated in one container. Residue samples will be collected from the accumulation container dedicated to each performance run. Method S007 (5) will be used to collect a representative sample.

3.2.2 Agent Sampling Method

Agent collected from the spray tanks will be held in ACS tanks until a sample is collected. It may be necessary to sample two ACS tanks for each STDT run. Samples of the agent drained from spray tanks will be taken using the method to collect the 500-gallon samples used for normal operation.

The samplers will pipet < 1 mL of Agent VX from the agent sample into a sample vial. The sample vial will be placed in an airtight container and transferred to the CAL. Samples will be delivered to the laboratory so that the requested analyses can be performed within the specified allowable holding time. Samples will be accompanied by the Chain of Custody (COC) record and by a sample analysis request form. The request form will list the analytes to be analyzed by the laboratory and the total number and type of samples shipped for analysis. Authorized laboratory personnel will acknowledge receipt of shipment by signing and dating the COC form.

3.2.3 Sampling Methods for Agent VX in Exhaust Gas

Destruction and Removal Efficiencies (DRE) will not be calculated for the STDT. Normal operations of the ACAMS and DAAMS are described in Attachment 22 to the RCRA Permit (6). The MPF STDT will require special operating conditions for the ACAMS and DAAMS to monitor Agent VX concentrations. The change to the ACAMS is that three ACAMS will be sampling the exhaust gas at the MPF Duct. One ACAMS will be in standby. The other two ACAMS will be staggered so that one ACAMS is always sampling. The stagger of the ACAMS will be verified hourly. The silver fluoride pads on the ACAMS will be changed before the runs and every four hours thereafter for the STDT. The pad will be changed in the standby ACAMS and then it will be switched with one of the operating ACAMS. The ACAMS taken out of service will be challenged at 1.0 ASC within 30 minutes to verify the pad was still functional.

The pad will be changed in this ACAMS and put in operation to allow the second ACAMS to be challenged and have the silver fluoride pad changed. This mode of operation will allow the pads to be changed without interrupting the monitoring of Agent VX or delay the run. The ACAMS will be challenged within 30 minutes of the end of the run to ensure the silver fluoride pad was still functional. The ACAMS monitoring the discharge airlock will be challenged before and after each run.

The DAAMS operation at the MPF Duct will be modified for the MPF STDT. A new set of DAAMS tubes will be placed in service no more than one hour before each run and removed after the last spray tank exits the MPF. The DAAMS tubes collected during the MPF STDT will be analyzed even if the ACAMS do not alarm. A QP will be included in each set of tubes. The QP analysis demonstrates that Agent VX on the DAAMS tubes is not destroyed or desorbed by the sampling process.

3.2.4 Additional Sampling Methods for Exhaust Gas

The exhaust gas will be monitored as outlined in Table 3-1 using CEMS and EPA methods for sampling metal emissions and PM. The monitoring of agent and CEMS will be conducted by EG&G. The TOCDF CEMS will collect data on the O₂ and CO exhaust gas concentrations. An outside subcontractor will collect the exhaust gas samples. The gas sampling protocols will be the EPA Methods 1, 2, 3, 5; and 29(2). Pretest and post-test leak checks will be performed for each sampling train as required in the respective test methods. Leak checks also will be performed at port changes. The O₂ and CO₂ concentration will be determined by Orsat analysis using Method 3. The PM emissions will be sampled using Method 5 (2). Metal emissions and total phosphorus emissions will be sampled using a Method 29 (2) sampling train.

3.2.5 Continuous Emissions Monitoring

The CEMS operated by EG&G as part of the RCRA Permit will be used to monitor the O₂ and CO concentrations on a continuous basis. The CEMS operation, calibration procedures, and preventive maintenance procedures are described in Attachment 20 (7). The sampling ports for the monitors are located in the duct between the ID fan and the common stack. The CO concentration will be determined using MPF monitors 14-AIT-384 and 24-AIT-669. The O₂ concentrations will be determined with MPF monitors 14-AIT-082 and 24-AIT-670. Exhaust gas sample oxygen corrections will be made from the CEMS data.

3.3 ANALYSIS METHODS

Detailed descriptions of the analysis methods are located in Section 9 of the QAPP located in Appendix A. Summaries of the methods used are included in this section for information only.

3.3.1 Analysis Methods for Process Stream Samples

Samples collected of the process streams will be analyzed for metal concentrations using SW-846, Methods 6010B and 7470A (1). The process samples will be analyzed for the metals used in the HHRA. Process samples will not be analyzed for phosphorus. Neat Agent VX samples will be analyzed by the CAL using TE-LOP-584 and TE-LOP-557.

3.3.2 Analysis Method for Residue Samples

A sample of the spray tanks ash residue for each run will be collected after the spray tanks have cooled and the residue removed from the spray tanks. Samples of the residue will be digested and then analyzed for the total HHRA metals using Method 6010B. Mercury in the solid residue samples will be analyzed by Method 7471A (1). The residue will be extracted by Method 1311, Toxicity Characteristic Leaching Procedure (TCLP) (1). The extract will be analyzed for TCLP Metals by Methods 6010B and 7470A (1). Residue samples will additionally be analyzed for Agent VX before they are shipped to the off-site laboratory.

3.3.3 Analysis Methods for Exhaust Gas Samples

Agent concentrations in the exhaust gas will be monitored during the MPF STDT but an agent DRE will not be determined. Samples of the exhaust gas will be collected using two different EPA sampling trains. Particulate matter will be analyzed by Method 5 (2). Metal emission samples will be analyzed by a modified Method 6020 and Method 7470A (1). Method 6020 was modified to include the analyses of phosphorus, tin and vanadium.

3.4 AUDIT SAMPLES

The DSHW may furnish audit samples during the MPF STDT. Provisions will be made to allow the DSHW representatives to spike process samples at their request. These samples will be packed, transported, and analyzed in the same manner as other samples. Results of the audit samples will be reported in units appropriate to the sample matrix and included in the final report.